

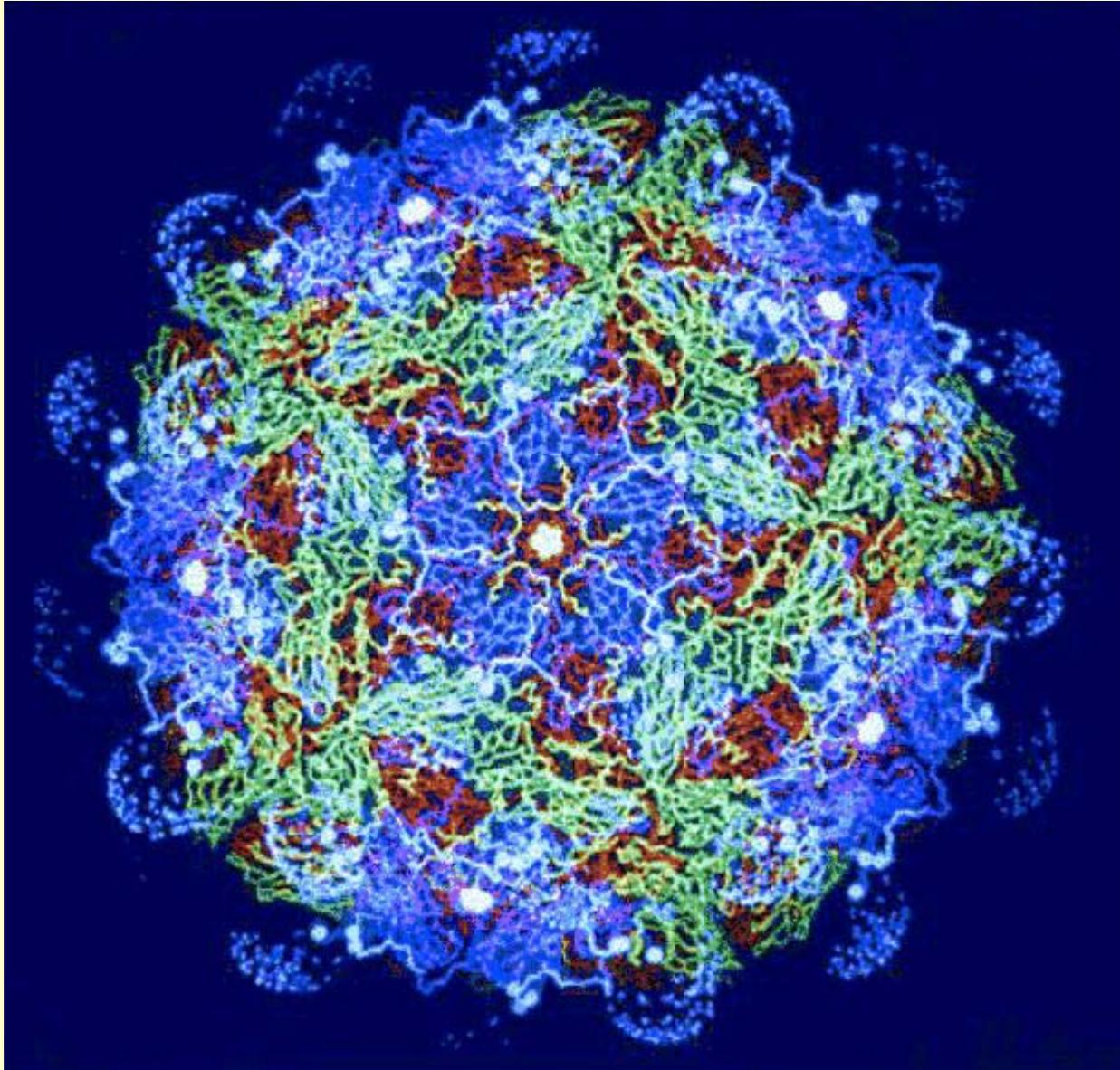
Foot and Mouth Disease
United Kingdom
2001

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October 8, 2002

Introduction

- Foot-and-mouth disease is an acute infectious viral disease causing fever, followed by the development of vesicles (blisters) chiefly in the mouth and on the feet.
- It is probably more infectious than any other disease affecting animals and spreads rapidly if uncontrolled.
- It affects cattle, sheep, pigs, and goats.
- Wild and domestic cloven hooved animals and elephants, hedgehogs and rats are also susceptible.



Genus: *Aphthovirus*

- FMD is one of two members of the Aphthovirus genus, within the family *Picornaviridae*.
- The FMD viral genome consists of a single strand of positive sense RNA of approximately 8,000 nucleotide bases.
- FMD virus is temperature-sensitive and is rapidly inactivated at elevated temperatures.
- FMD virus is extremely sensitive to pH. Virus survival is optimal between pH 7.2 and 7.6. At pHs above 9 and below 6 the virus is rapidly destroyed.
- FMD virus can survive for long periods of time in dark, moist conditions but is rapidly inactivated by a combination of desiccation, pH and temperature.

Serotypes

- FMD virus is antigenically heterogeneous. Seven serotypes are recognized, O, A, C, SAT1, SAT2, SAT3, ASIA1 (SAT = Southern African Territories).
- Each serotype of FMD is antigenically distinct from the other six serotypes. Furthermore, within each serotype, there is considerable antigenic diversity. For this reason, antisera raised to one strain of a serotype may not recognize other strains of the same serotype

FMD cannot be differentiated clinically from other vesicular diseases, including swine vesicular disease, vesicular stomatitis and vesicular exanthema.

Laboratory diagnosis of any suspected FMD case is therefore a matter of urgency.

Identification of the Agent

- The demonstration of FMD viral antigen is sufficient for a positive diagnosis.
- The demonstration of FMD specific antibodies is NOT sufficient for a positive diagnosis for active infection: can not rule out prior vaccination or previous infection/carrier state.

Complement Fixation & ELISA

- Complement fixation (CF) has been the traditional test for diagnosis, but has been replaced in many laboratories by the enzyme-linked immunosorbent assay (ELISA), as this is more specific and sensitive and is not affected by pro- or anti-complementary factors.
- If the sample is inadequate or the test result inconclusive, it will be necessary to grow the virus in cell cultures or in 2-7-day old unweaned mice. When a cytopathic effect (CPE) appears in the cultures, the fluids can be used in CF tests or ELISAs.

Other Diagnostic Tests

- Nucleic acid recognition tests, such as the polymerase chain reaction and in situ hybridization, are being used increasingly as rapid and sensitive diagnostic methods.
- Electron microscopic examination of lesion material is sometimes useful to differentiate FMD from disease caused by pox or other viruses.

Serological Tests

- The demonstration of specific antibody titers in non-vaccinated animals, where a vesicular condition is present, is sufficient for a positive diagnosis.
- Virus neutralization (VN) tests and ELISA are used as serotype-specific serological tests.
- VN tests depend on tissue cultures and are more prone to variability than ELISA; they are also slower and subject to contamination.
- ELISAs for antibodies have the advantage of being faster and are not dependent on cell cultures.

Laboratory Diagnosis

- Collection and submission of samples
- Antigen detection by virus isolation -
ELISA, PCR
- Antibody detection by virus neutralization -
ELISA
- Virus characterization - antigenic and
genomic

Clinical Signs: Cattle

- Slobbering and smacking lips
- Shivering
- Tender and sore feet
- Reduced milk yield
- Sores and blisters on feet, mouth and mammary gland
- Raised temperature







Clinical Signs: Sheep

- Sudden, severe lameness
- Tendency to lie down
- Reluctant to move when made to stand
- Blisters on the hoof and mouth
- May be off color / ADR
- - and -MOUTH





Clinical Signs: Pigs

- Sudden lameness
- Tendency to lie down
- Lameness, may squeal loudly
- Blisters form on the upper edge of the hoof,
- where the skin and horn meet
- Blisters on the snout or tongue
- Off feed
- Disease
- Public
- Information





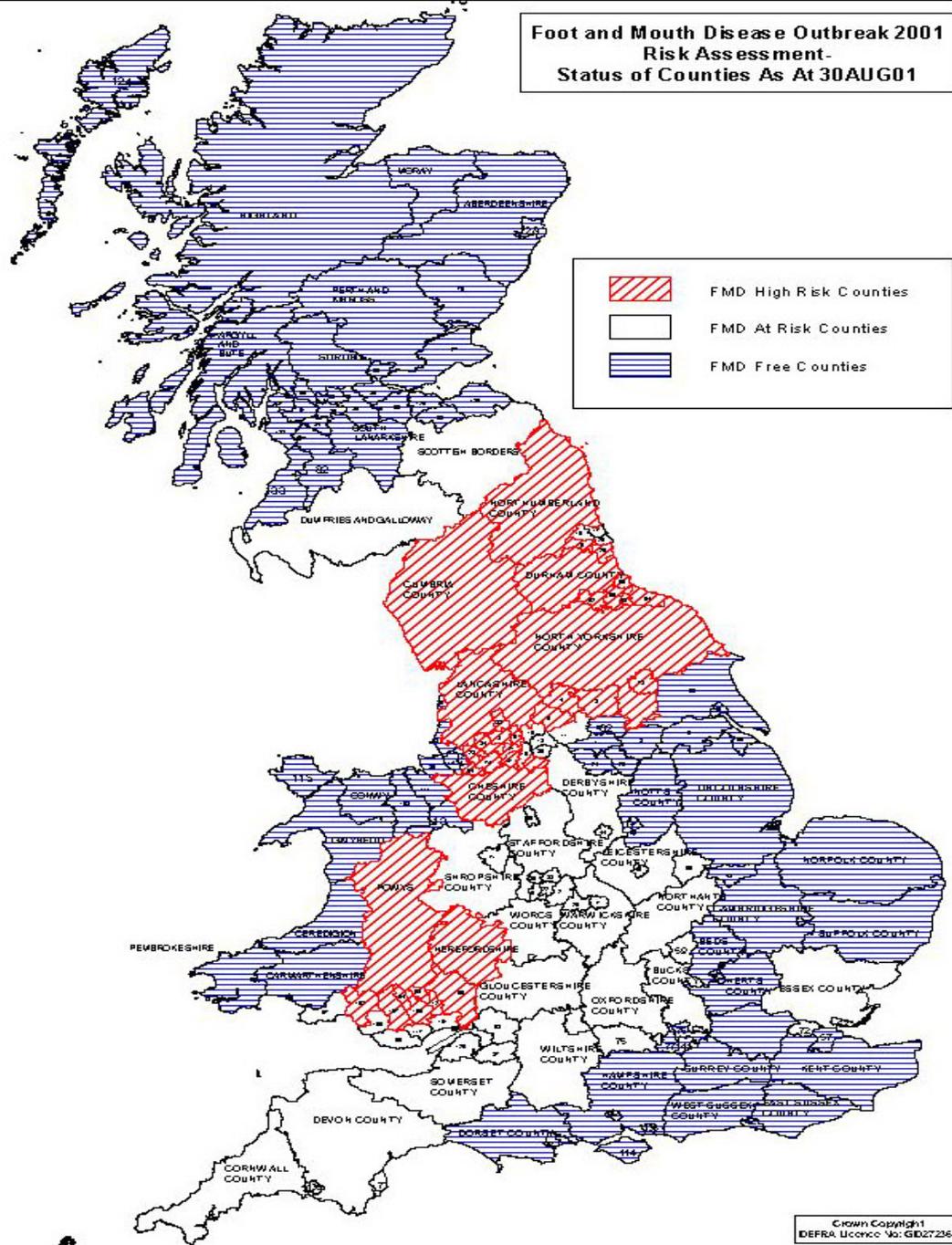




Epidemiology

- Distribution of the disease
- Virus transmission - aerosols, prediction of spread
- Susceptibility to infection
- The carrier state
- Risk analysis

**Foot and Mouth Disease Outbreak 2001
Risk Assessment -
Status of Counties As At 30AUG01**



	FMD High Risk Counties
	FMD At Risk Counties
	FMD Free Counties











Source of the Outbreak

- There has been speculation that the practice of feeding swill to pigs was a cause or the cause of the outbreak.
- The farm in question at Heddon-on-the-Wall was licensed to feed swill to pigs.
- Epidemiological and other investigations continue.
- The Government will not comment on the specifics of the case until all investigations are complete.

ORIGIN OF THE 2001 FOOT AND MOUTH DISEASE EPIDEMIC

- The origin for that outbreak is considered to have been a pig finishing unit in the North-East of England.
- The source of the virus responsible for the epidemic was most probably meat or meat products infected or contaminated with the FMD virus but it unlikely that the origin of this material and the route by which it entered the UK will ever be identified.

The disease spread via two routes:

1. the movement of diseased pigs to holdings in Essex and Kent
 2. through windborne spread of FMD virus to sheep on a neighboring holding followed by their subsequent sale via markets and dealers in Northern England
- **In the course of these movements other sheep, people and vehicles, became infected spreading disease widely throughout England, Wales and the southern counties of Scotland**

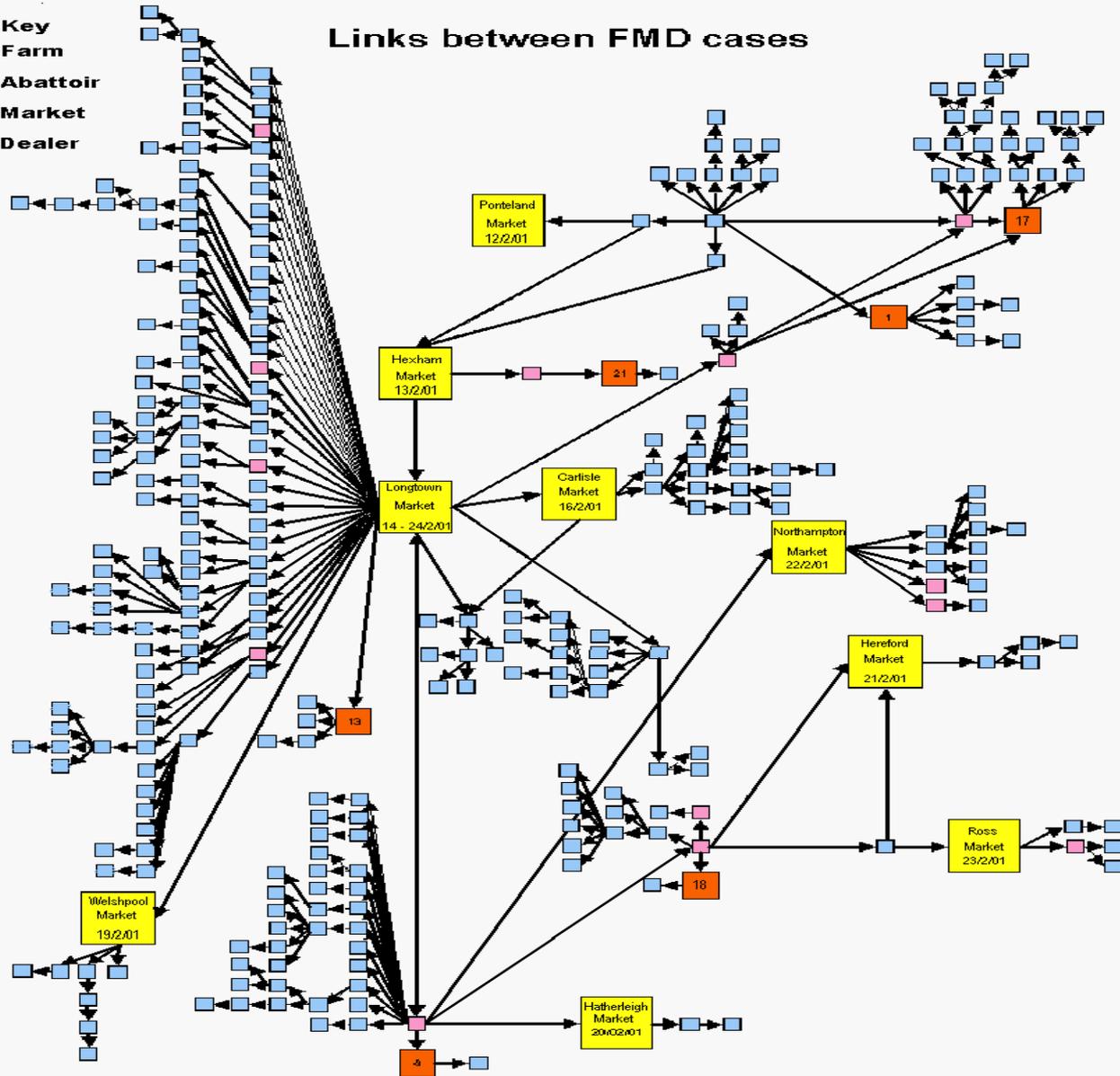
Spread of the Disease

- **DIRECT TRANSMISSION:**
 - Airborne
 - Large amount in blisters and vesicles
 - Blood and all parts of body.

- **INDIRECT TRANSMISSION:**
 - Contact with contaminated food
 - Cattle trucks, lorries
 - Market places, loading ramps and roads
 - Fomites: People, other animals, mechanical – etc.

- Key**
- Farm
 - Abattoir
 - Market
 - Dealer

Links between FMD cases



FMD cases till 23/03/01 16:00 MAF F
 NB links are subject to current information

Control Strategies

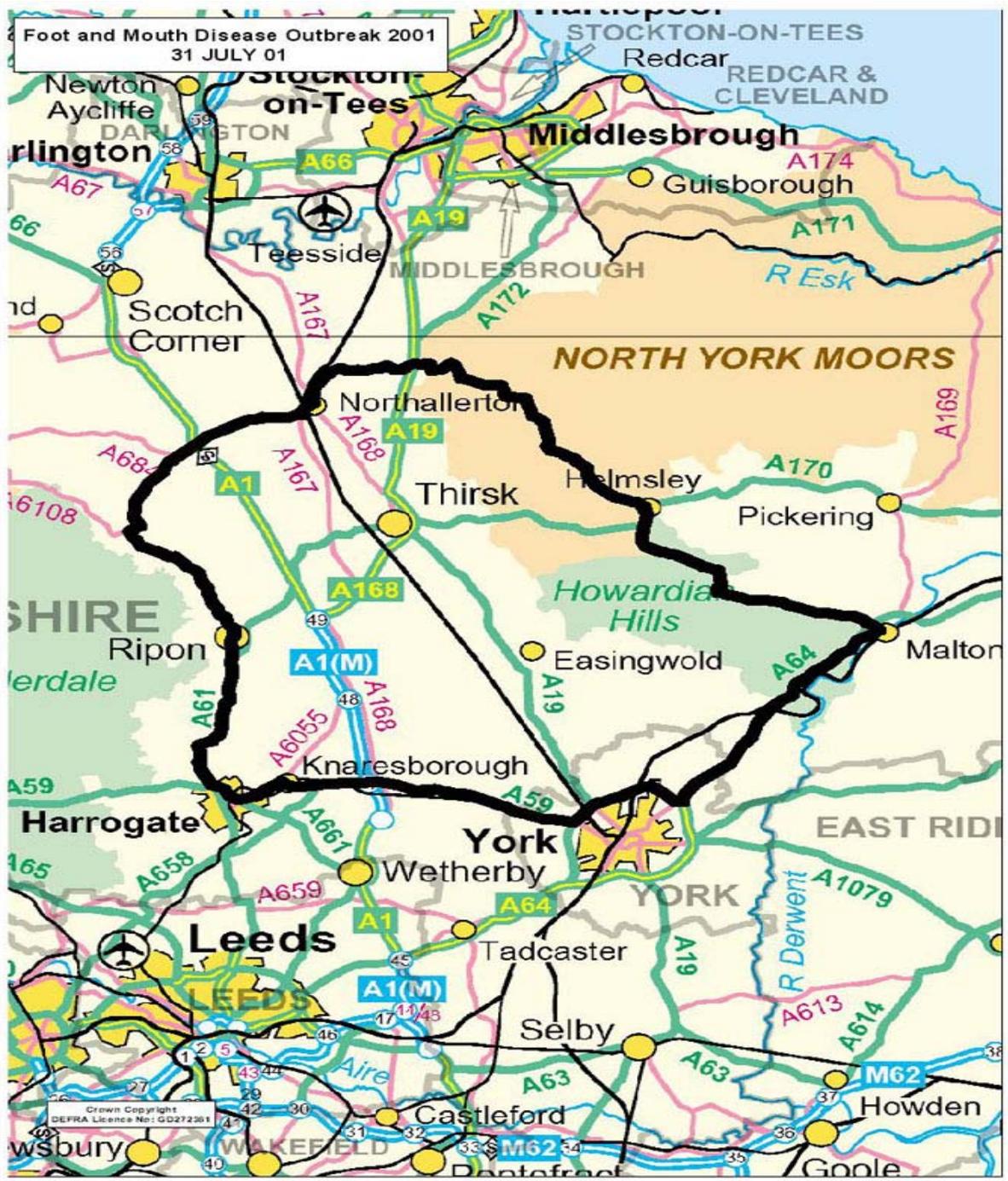
- Stamping out
- Tracing
- Combined strategies
- Legislation
- Quarantine
- Movement controls
- Vaccination
- Contingency plans
- Import/export regulations

Categories of Risk

- **Infected Premises (IPs)**
- **Dangerous Contacts (DCs)**
- **Contiguous Premises (CPs)**
- **Slaughtered on Suspicion (SOS)**

Total animals slaughtered	IP's	DC + CP's	DC + Non-CP's	SOS	Grand Total
<i>Cattle</i>	314921	182408	78733	1409	590111
<i>Sheep</i>	940092	925194	1095929	102404	3063619
<i>Pigs</i>	26570	60267	49473	2378	138688
<i>Goats</i>	903	1023	228	288	2442
<i>Deer</i>	8	97	404	0	509
<i>Other</i>	987	11251	1037	18	13293
Grand Total	1283481	1180240	1225804	119137	3808662

Foot and Mouth Disease Outbreak 2001
31 JULY 01



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Register of Veterinary Surgeons

Temporary List



Royal College
of Veterinary
Surgeons

This is to certify that

Michelle Beth Kahn

being a person holding a foreign qualification in veterinary surgery
has been registered in the Temporary List of the Register of Veterinary Surgeons
under section 7(1) of the Veterinary Surgeons Act 1966
with permission of the Council to practise veterinary surgery
during the period 26th July 2001 to 25th July 2002 in areas designated by the
Ministry of Agriculture, Fisheries and Food at 1A Page Street, 5th Floor, area 505
London SW1P 4PQ

To assist with the Foot and Mouth outbreak only
the MRCVS Supervisor being Mr G H Marshall BVMS MRCVS

A handwritten signature in black ink, reading "Jane C. Allen".

Registrar

Certificate Number: 3001660

Date of issue: 26 July 2001

Special biosecurity measures imposed in North Yorkshire

- Strict enforcement of biosecurity measures in a designated area of North Yorkshire around Thirsk began on 30 July 2001.
- Thirsk is a highly populated swine farming area.
- Swine are approximately 3,000 times more infective than sheep or cattle.
- The following biosecurity measures were placed in operation. (30 July 2001)

An outer 'buffer' zone was established in which there could be no movement of animals into or out of the zone except those under license to slaughter for human consumption/Livestock Welfare Disposal Scheme

**Foot and Mouth Disease Outbreak 2001
YORKSHIRE/LANCASHIRE MCA**



STATUTORY INSTRUMENTS

2001 No.

ANIMALS, ENGLAND AND WALES ANIMAL HEALTH

The Foot-and-Mouth Disease (Restricted Infected Area)

Declaratory Order 2001

Made 29th, July 2001

Coming into force on 30th, July 2001

The Minister of Agriculture, Fisheries and Food, in exercise of the powers conferred on her by article 29C of the Foot-and-Mouth Disease Order 1983 **(a)** (made under section 17(1) of the Animal Health Act 1981 **(b)**), and of all other powers enabling her in that behalf, makes the following Order:

Title and commencement

1. This Order may be cited as the Foot-and-Mouth Disease (Restricted Infected Area) Declaratory Order 2001 and shall come into force on 30th July 2001.

Declaration of infected area

2. The area described in the Schedule below is declared to be an infected area to which the provisions of Part IIIA of the Foot-and-Mouth Disease Order 1983 apply.

“Foot and mouth 'war zone' declared in North Yorks”

- 50,000 sheep to be tested to stop spread into premier pig farms
- **By Peter Hetherington and Patrick Wintour**
- **Tuesday July 31, 2001**
- **[The Guardian](#)**
- **Government vets are to test 50,000 sheep in North Yorkshire in the most intensive campaign yet against foot and mouth, amid renewed concern the virus could spread to Britain's premier pig farms a few miles south.**
- **Police and council trading standards officers yesterday started patrolling roads and farm gates round the clock in a new 900 square mile biosecurity zone near the town of Thirsk, where a cluster of cases suggests the disease could be out of control.**

New Biosecurity measures in North Yorkshire

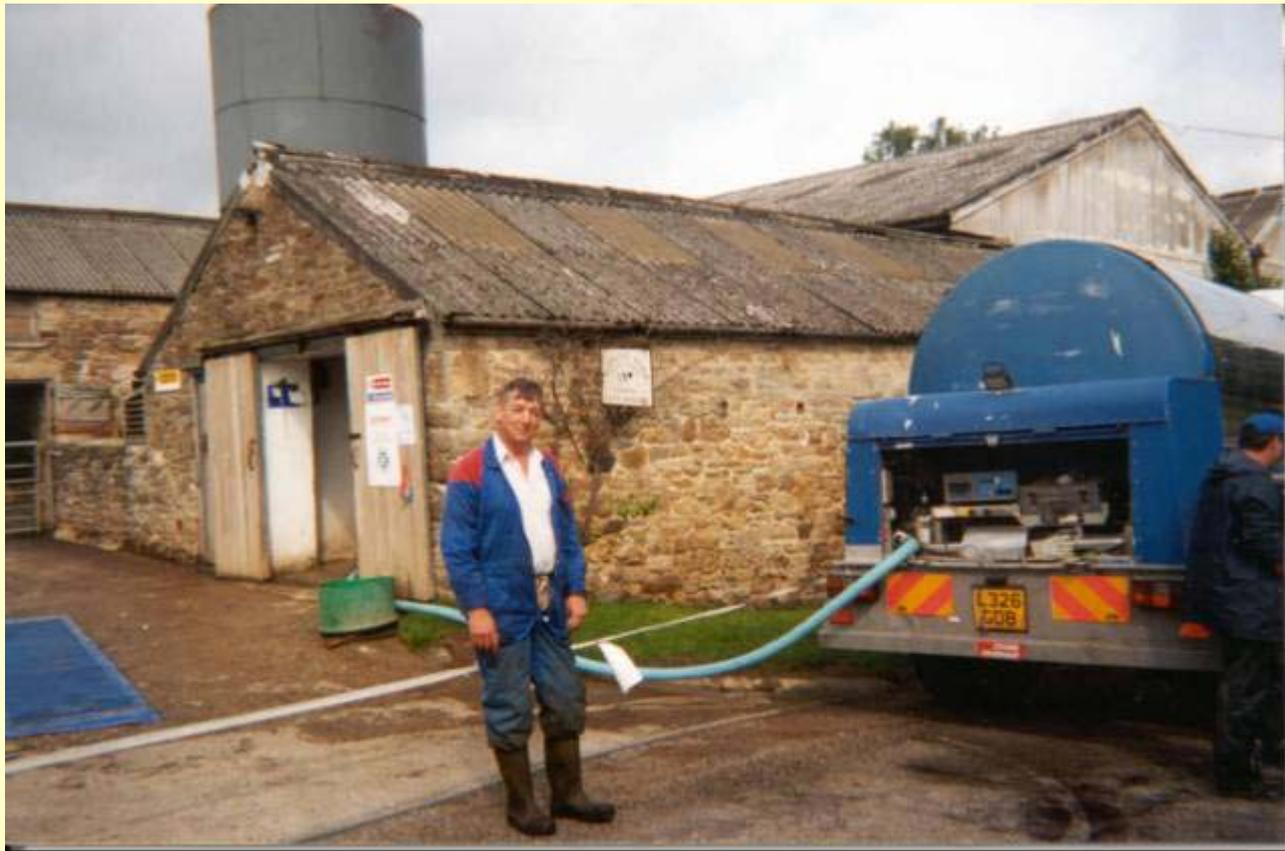
- ***31 July 2001***
- A Biosecurity Intensification Area has been put in place around the Thirsk area of North Yorkshire.

Restrictions

- a **general ban on all movements of animals** on to and off farms except those under license to slaughter for human consumption or the Livestock Welfare Disposal Scheme
- the **cleansing and disinfection of all vehicles**, including silage/feed/milk tankers/farmers own vehicles etc before entering and when leaving farms – enforced by law
- all **movements of feed and milk** on to and off farms must be **licensed** - [two general licenses](#) were issued at midnight on Sunday 29 July including requirements for the use of [dedicated tankers within the Biosecurity Intensification Area](#) (BIA) and for all [milk tanker deliveries or collections to be accompanied by a DEFRA official](#) to ensure cleansing and disinfection requirements are met in full.
- **livestock farmers must maintain footbaths** at every exit to their premises and to renew the disinfectant frequently.

Restrictions, Cont.

- **additional cleansing and disinfection** stations are being established within the BIA. Where farm-bound vehicles and those vehicles coming from farms within the BIA are judged to require additional cleansing and disinfection they will be directed to the nearest cleansing and disinfection point. Additionally, feed vehicles with depots located outside the BIA will be required to use the most convenient cleansing and disinfection point before leaving the BIA. Colored stickers will be issued to vehicles passing through cleansing and disinfection points to aid enforcement
- **silage vehicles** will require specific licenses to go onto/off farms. Discharge of slurry by jet/spray will also require a license.
- in relation to the movement of people onto and off farms, **clothing/boots** worn when handling susceptible livestock **must be left on the premises** and proper personal hygiene precautions followed rigorously;







Blood sampling was conducted on farms within the BIA. Fifteen teams, each led by a **vet**, conducted a statistical bleed of sheep in the Thirsk area. Working inwards from the edge of the BIA 'blue zone' they will sample all sheep flocks.













26 Aug 2001
YORKSHIRE FMD OUTBREAK
SHOWS NEED FOR
CONTINUED VIGILANCE

Keep Foot-and-Mouth Disease OUT of America

Remember to declare **any** visits to farms or contact with livestock.

Remember to declare **all** food and agricultural items in your possession on your Customs form.

Failure to do so could result in a fine of up to \$1,000.



U.S. Department of Agriculture
Animal and Plant Health Inspection Service

asd